CLAIMS:

1. In an earth boring bit having a bit body with at least one depending leg, a cylindrical bearing pin extending from the leg, a rotatable cone having a cylindrical cavity that fits slidingly on a journal surface of the bearing pin, the improvement comprising:

a recess on an exterior portion of the journal surface that is in the range from 185 to 225 degrees as seen from an inner end of the bearing pin.

2. The bit according to claim 1, wherein during operation of the drill bit, a lubricant pressure profile measured circumferentially around the clearance has a maximum positive peak followed by an immediate reduction zone to a minimum amount, and wherein the recess is located substantially at the immediate reduction zone.

3. The bit according to claim 1, further comprising:

a lubricant chamber comprising a lubricant reservoir in the body and an annular clearance surrounding the journal surface;

a pressure compensator in the reservoir for reducing pressure differential between lubricant in the reservoir and hydrostatic pressure surrounding the bit; and

a passage leading from the recess through the bearing pin to a position in the lubricant chamber that is substantially at the same pressure as that in the lubricant reservoir.

4. The bit according to claim 1, further comprising a passage leading from the recess through the bearing pin to an unloaded side of the bearing pin.

5. The bit according to claim 1, further comprising:

a lubricant chamber comprising a lubricant reservoir in the body and an annular clearance surrounding the bearing pin;

a pressure compensator in the reservoir for reducing pressure differential between lubricant in the reservoir and hydrostatic pressure surrounding the bit;

a first passage leading from the reservoir to an exterior portion of the bearing pin; and

a second passage leading from the recess to the reservoir.

6. An earth boring bit, comprising:

a bit body having at least one depending leg;

a cylindrical bearing pin extending from the leg along a bearing pin axis;

a rotatable cone having a cylindrical cavity that fits slidingly on a journal surface of the bearing pin, defining an annular clearance between the cavity and the journal surface, wherein weight imposed on the bit during drilling causes the annular clearance to be greater on an upper portion of the journal surface than on a lower portion of the journal surface;

a lubricant reservoir in the body;

a pressure compensator mounted to the body for reducing pressure differential between hydrostatic drilling fluid pressure exterior of the bit and pressure in the lubricant reservoir;

a recess on an exterior portion of the journal surface between inner and outer ends of the journal surface; and

wherein during operation of the drill bit, a lubricant pressure profile measured circumferentially around the clearance has a maximum positive peak followed by an immediate

reduction zone to substantially the pressure of the lubricant in the lubricant reservoir, and wherein the recess is located substantially at the occurrence of the immediate reduction zone.

7. The bit according to claim 6, further comprising:

a passage leading from the recess through the bearing pin to a position in the lubricant chamber that is substantially at the same pressure as that in the lubricant reservoir.

8. The bit according to claim 6, further comprising a passage leading from the recess through the bearing pin to an unloaded side of the bearing pin.

9. The bit according to claim 6, further comprising:

a first passage leading from the reservoir to an exterior portion of the bearing pin; and

a second passage leading from the recess to the reservoir.

10. An earth boring bit, comprising:

a bit body having at least one depending leg;

a cylindrical bearing pin having an outer end joined to the leg and an inner end, the bearing pin extending downward and inward relative to an axis of rotation of the bit;

a rotatable cone having a cylindrical cavity that fits slidingly on a journal surface of the bearing pin,

a lubricant reservoir in the body;

a pressure compensator mounted to the body for reducing pressure differential between hydrostatic drilling fluid pressure exterior of the bit and pressure in the lubricant reservoir;

wherein under operating loads, the cone becomes eccentric relative to the bearing pin, resulting in an annular clearance between the cone and the journal surface that has a converging zone leading to a minimum clearance point and a diverging zone leading from the minimum clearance point to an unloaded side of the journal surface; and

a recess located on the journal surface in a central area between inner and outer ends of the journal surface in the diverging zone closer to the minimum clearance point than the maximum clearance point.

11. The bit according to claim 10, wherein the bit has a lubricant pressure profile during operation that has a maximum positive peak in the converging zone near the minimum clearance point, and an immediate reduction zone in the diverging zone near the minimum clearance point, and the recess is located at the immediate reduction zone.

12. The bit according to claim 10, further comprising:

a passage leading from the recess through the bearing pin to a position in the lubricant chamber that is substantially at the same pressure as that in the lubricant reservoir.

13. The bit according to claim 10, further comprising a passage leading from the recess through the bearing pin to an unloaded side of the bearing pin.

14. The bit according to claim 10, further comprising:

a first passage leading from the reservoir to an exterior portion of the bearing pin; and

a second passage leading from the recess to the reservoir.

15. In an earth boring bit having a bit body with at least one depending leg, a cylindrical bearing pin extending from the leg, a rotatable cone having a cylindrical cavity that fits slidingly on a journal surface of the bearing pin, a lubricant reservoir in the body, and a first passage leading from the lubricant reservoir to an exterior portion of the bearing pin, the improvement comprising:

a second passage leading from the reservoir to a port on an exterior portion of the journal surface that is in the range from 185 to 225 degrees as seen from an inner end of the bearing pin.

16. The bit according to claim 15, wherein during operation of the drill bit, a lubricant pressure profile measured circumferentially around the clearance has a maximum positive peak followed by an immediate reduction zone to a minimum amount, and wherein the port of the second passage is located substantially at the immediate reduction zone.

17. The bit according to claim 15, wherein the port of the second passage is in a midsection area between a last machined surface of the bearing pin and an inner end of the journal surface.

18. An earth boring bit, comprising:

a bit body having at least one depending leg;

a cylindrical bearing pin extending from the leg along a bearing pin axis;

a rotatable cone having a cylindrical cavity that fits slidingly on a journal surface of the bearing pin, defining an annular clearance between the cavity and the journal surface, wherein

weight imposed on the bit during drilling causes the annular clearance to be greater on an upper portion of the journal surface than on a lower portion of the journal surface;

a lubricant reservoir in the body;

a pressure compensator mounted to the body for reducing pressure differential between hydrostatic drilling fluid pressure exterior of the bit and pressure in the lubricant reservoir;

a first passage leading from the reservoir to a port on an exterior portion of the bearing pin;

a second passage separate from the first passage and leading from the reservoir to a port on an exterior portion of the journal surface for supplying lubricant from the reservoir to the annular clearance; and

wherein during operation of the drill bit, a lubricant pressure profile measured circumferentially around the clearance has a maximum positive peak followed by an immediate reduction zone to substantially the pressure of the lubricant in the lubricant reservoir, and wherein the port of the second passage is located substantially at the occurrence of the immediate reduction zone.

19. The bit according to claim 18, wherein the port of the second passage is located at a point in the range from 185 to 225 degrees when facing an inner end of the bearing pin.

20. An earth boring bit, comprising:

a bit body having at least one depending leg;

a cylindrical bearing pin having an outer end joined to the leg and an inner end, the bearing pin extending downward and inward relative to an axis of rotation of the bit;

a rotatable cone having a cylindrical cavity that fits slidingly on a journal surface of the bearing pin,

a lubricant reservoir in the body;

a pressure compensator mounted to the body for reducing pressure differential between hydrostatic drilling fluid pressure exterior of the bit and pressure in the lubricant reservoir;

a first passage leading from an exterior portion of the bearing pin to the reservoir; wherein

under operating loads, the cone becomes eccentric relative to the bearing pin, resulting in an annular clearance between the cone and the journal surface that has a converging zone leading to a minimum clearance point and a diverging zone leading from the minimum clearance point to an unloaded side of the journal surface;

a second passage leading from the reservoir to a portion of the journal surface in the diverging zone closer to the minimum clearance point than the maximum clearance point.

21. The bit according to claim 20, wherein the second passage terminates on the journal surface in the range from 185 to 225 degrees when facing the inner end of the bearing pin, with zero being top dead center of the bearing pin.

22. The bit according to claim 20, wherein the second passage terminates in a midsection area between the inner and outer ends of the journal surface.

23. The bit according to claim 20, wherein the bit has a lubricant pressure profile during operation that has a maximum positive peak in the converging zone near the minimum clearance

point, and an immediate reduction zone in the diverging zone near the minimum clearance point, and the port of the second passage is located at the immediate reduction zone.